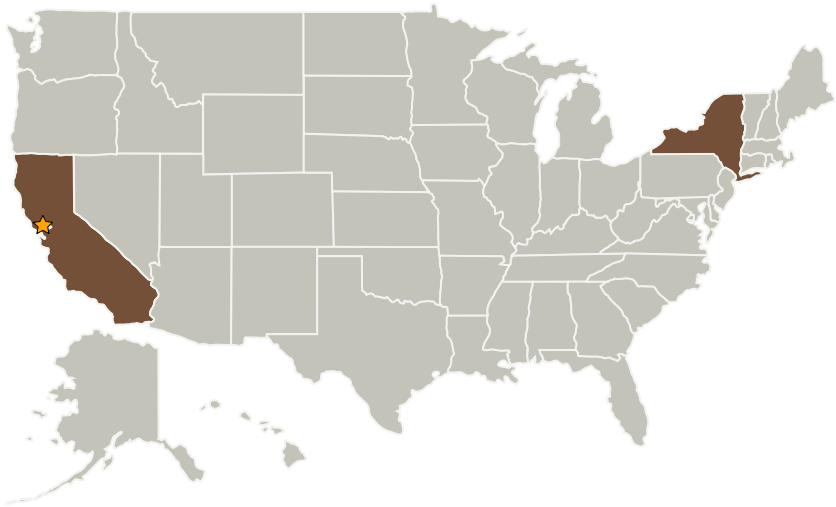
Automated Contingency Management for Advanced Propulsion Systems, Phase I

Completed Technology Project (2004 - 2005)

Project Introduction

Impact Technologies LLC, in cooperation the Georgia Institute of Technology, proposes to develop and demonstrate an innovative Automated Contingency Management (ACM) concept for advanced propulsion systems that will provide a superior level of engine fault accommodation and optimized performance based on a seamless integration between the engine health management (EHM) system and the engine controller. Utilizing a sophisticated engine simulation model with full transient capability and integrated control, a software-in-the-loop demonstration will be delivered that will be capable of realistically simulating various control sensor failures, actuator faults, and engine degradation scenarios with associated results obtained comparing the benefits of the ACM technologies implemented. The proposed ACM software hierarchy will act from the engine subsystems level up through the air vehicle level and will implement advanced fault-accommodating control, health management, and intelligent software agents to accomplish its goal. The core innovations of this project include: 1.) The development of advanced fault detection algorithms for sensor, actuator and component faults in different flight regimes; 2.) The development of intelligent software agents for achieving optimal dynamic performance under faulty propulsion dynamics; and 3.) The development of reconfigurable control algorithms linked to the EHM system for guaranteeing the stability of the fault-accommodating control system.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Impact Technologies, LLC	Supporting Organization	Industry	Rochester, New York

Primary U.S. Work Locations	
California	New York

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.5 Propulsion Flowpath and Interactions